Trailer Towing Safety: How Load Weight Distribution and Tow Vehicle Size Affects Trailer Sway

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Loading a trailer improperly may cause dangerous sway, resulting in accidents and possible death. I researched and tested how to most safely haul a trailer to reduce sway. I focused on two main elements: weight distribution and size of tow vehicle. I predicted that the largest vehicle with the load distributed over the axle would result in the least amount of sway. I evaluated the amount of sway resulting from four different tests with four different vehicles. First, I distributed the load on the trailer in four different positions: front, 60 percent in front of the axle and 40 percent behind, directly over the axle, and in the far-back position. Second, I tested four different sizes of tow vehicles: One-ton, three-quarter-ton, half-ton, and a small SUV. The most amount of sway for each vehicle was in the far-back position. Sway reduced in the over-axle position and in the 60/40 position, but increased in the front position. The largest vehicle experienced little change between the four tests. The smallest was dominated by the trailer in all positions, so it was unsafe to perform the test. The plotted evaluations of the three larger vehicles resulted in parabolic curves, with less magnitude as vehicle size increased. As the size of the tow vehicle increased, the amount of sway decreased. However, instead of loading the weight directly on the axle, it is safest to pull with 10 percent of the gross trailer weight on the tongue, which is exactly the 60/40 position.

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